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ABSTRACT

This issue, number 40 in the series, is divided into two sections: (1) science activities in Britain, and (2) overseas and international activities. Presented in a newsletter format, numerous topics of interest to secondary school science and mathematics educators pertaining to British education are presented. Included are announcements for conferences and meetings in 1980, information about new textbooks, descriptions of courses offered for teachers in England and overseas, and evaluations of current science and mathematics projects. The overseas/international section is devoted to news items from the Caribbean, Africa, and Nicaragua. Reports on several Unesco projects, international conference reports, and announcements are also included. (CS)

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Science Education Newsletter

Issued by the
Education and Science Division
The British Council

ED182179

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SE 029 973

September 1979

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Science Education Newsletter No 40

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CASME Registration Form

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ACTIVITIES IN BRITAIN

1 ASSOCIATION FOR SCIENCE EDUCATION ANNUAL MEETING 1980

The annual meeting will be held at the University of Hull from January 2 — 5, 1980.

The meeting will include symposia, lectures, visits, exhibitions, workshops, films, members' papers and social events.

There will be a programme of lectures by members of the host University as well as the Macmillan Education Lecture and the Nuffield Foundation for Science Education lecture 'The Idea of Progress' to be given by Mr John Maddox.

Exhibitions of publishers' and manufacturers' materials and members' original work will be staged as usual.

The British Council is organising a half-day symposium 'The Message and the Medium' focussing on publication problems in the production of written curriculum materials for teachers and pupils, especially in the developing countries. There will be a supporting exhibition of materials from a number of countries. The subjects of the other symposia include:

Uses of computers in teaching science
Science books for the 80's
Applications of psychology to science teachers
New voices in chemical education
Microscopy in the classroom
Science 9—13: what should middle schools do?
Schools and industry
Safety in school laboratories
Educational research in science teaching.

Members travelling by British Rail are offered a 30% reduction in fares. Application forms and further information are available from:

Annual Meeting Secretary, ASE
College Lane
Hatfield, Herts AL10 9AA

2 MATHEMATICAL ASSOCIATION, ANNUAL CONFERENCES

The next 2 annual conferences of the Mathematical Association are as follows:

April 9—12, 1980, at Durham
April 12—15, 1981, at Leeds.

3 MATHEMATICS APPLICABLE GROUP (SEN 31.7)

The Schools Council/Reading University Curriculum Project developed a series of ten books based on the teaching of mathematics at sixth form level through the modelling of real situations.

At the conclusion of the Project, a voluntary association of mathematics teachers and others was formed under the title of The Mathematics Applicable Group, to continue work on this approach to the teaching and learning of mathematics. The major aims of the Group are to promote the use and development of 'projective' modelling and solving interesting real-life problems in the mathematics curriculum.

The Group issues annual Workshop reports and a number of occasional modelling papers. It also issues a Newsletter containing information about the Group's activities and other developments. The Group meets at national level at an annual workshop at Reading University each summer; interested overseas visitors are welcome.

The following publications are so far available:

The Sixth Form Mathematics Project 1969-78; pub May 1979. £0.35. A leaflet summarising the work of the Sixth Form Mathematics Project over its ten-year life.

MAG Workshop Report number 1. Modelling with Trigonometry. pp 48; April 1979; ISBN 0 7049 0635X. £0.90. This booklet contains a considerable number of case-studies of problem situations, and outlines approaches to solutions which could be used in addition as teaching techniques.

Modelling the Electronic Bus Stop. pp 11; May 1979. £0.35. An extended study of the modelling approach to a practical situation.

MAG News-1; pp 4; January 1979. Free. The first issue of the Mathematics Applicable Group newsletter, describing the early work of the Group.

MAG News-2; pp 4; July 1979. Free. Information about recent and forthcoming activities of the Group.

Enquiries about the work of the Group may be directed to Mr Rex Watson, Secretary, Mathematics Applicable Group, The Mathematics Department, Homerton College, Cambridge.

Orders for publications should be sent to the Mathematics Applicable Group, School of Education, Reading University, London Road, Reading, RG1 5AQ, Berkshire, UK. Cheques should be made payable to the 'Mathematics Applicable Group'.

4 OPEN UNIVERSITY: COURSE FOR MATHEMATICS TEACHERS

A major new mathematics course for all teachers, called 'Mathematics across the Curriculum', is available from The Open University in the academic year 1979 — '80.

It is one of six mathematiacs courses to be included in the University's associate-student programme designed for adults wanting to take a single course rather than to enrol in an undergraduate course leading to a degree.

No formal educational qualifications are needed to take a course and, like all Open University courses, teaching is through correspondence texts, backed up by television and radio programmes.

A prospectus with full course descriptions can be obtained from:

ASCO
The Open University
PO Box 76
Milton Keynes MK7 6AN

5 BRITISH SOCIETY FOR THE PSYCHOLOGY OF LEARNING MATHEMATICS

At the International Congress on Mathematical Education at Karlsruhe in 1976, those present at the Working Group on the Psychology of Learning Mathematics decided to have regional meetings prior to the next International Congress in America in 1980. For practical reasons the organisation divided into a European group (based in Britain) and a North American group.

The European group has now formed itself into a society called the British Society for the Psychology of Learning Mathematics (BSPLM).

The Society is concerned with research and the communication of research findings to teachers. It encourages interested teachers to do research in their own classroom. Its interests are not confined to Britain.

The Society now has over 100 members. It has organised a number of 1- or 2-day meetings, at which recent research results on various aspects of mathematics learning have been shared and discussed.

Future meetings: November 3 1979, at Homerton College, Cambridge (contact Miss H Shuard).

January 3—4 1980, University of Nottingham (contact Dr Alan Bell, Shell Centre for Maths Education, University Park, Nottingham NG7 2RD).

This meeting at Nottingham will include the election of the new Committee.

Visitors from overseas are welcome at BSPLM meetings. Membership of the Society if £1 per year, for which the members receive copies of the occasional newsletters.

The Treasurer is Mrs C Hoyles, North London Polytechnic, Holloway Road, London N7.

Further information can be obtained from the Convenor, Dr K Hart, CSMS, 88-89 Lillie Road, London SW6 7SR.

6 DIME PROJECTS (DEVELOPMENTS IN MATHEMATICS EDUCATION) (SEN 32.13).

Dime Projects has produced a wide range of learning materials to help bridge the gap at the upper primary/lower secondary level between traditional teaching methods and pupil understanding. Simple, original pieces of apparatus are supported by a variety of pupil booklets which rarely fail to stimulate childrens' interest and imagination.

The latest addition to the DIME range is the Rotagram, a learning aid for angle and rotation concepts. It is accompanied by a series of Rotagram booklets and corresponding sets of worksheets.

DIME is directed by Mr Geoff Giles, of the Department of Education, University of Stirling, Scotland. All DIME materials are being distributed through Oliver and Boyd, Croythorn House, 23 Ravelston Terrace, Edinburgh EH4 3TJ, Scotland, from whom full details of costs and availability may be obtained.

7 THE ROYAL SOCIETY EDUCATION COMMITTEE: NEW DISCUSSION PAPER 1979 'Science and the Organisation of Schools in England: Implications for the Needs of Talented Children.'

Are the particular needs of gifted children well served in a comprehensive school? Should pupils be 'setted' or taught in mixed-ability groups? Should schools offer the three sciences as separate subjects, or teach some form of integrated science? These are some of the practical and topical issues with which this Royal Society Discussion Paper deals, in a straightforward and perhaps not uncontroversial manner.

The paper was prepared by Sir Nevill Mott on behalf of the Royal Society Education Committee, following an extensive programme of visits to schools, colleges, university departments of education, etc, by members of the Committee and others.

The paper discusses, from the standpoint of science and mathematics, the opportunities for talented children in the age group 11—16 within the maintained school system. The major issues raised are

(i) the advantages and disadvantages of retaining to GCE 'O' level (or the equivalent in a common 16+ examination system) separate subject studies in science, contrasted with some form of combined or integrated science, perhaps equivalent to two 'O' levels in the present system;

(ii) the needs of children whose talents are more practical than academic;

(iii) enrichment facilities available to gifted children;

(iv) setting versus mixed-ability teaching, and the effect of falling enrolments on opportunities for setting in secondary schools.

On (i), arguments on both sides are presented. The working party hopes for the retention of facilities for separate subject teaching in as many schools as possible, both because many science teachers are most effective when teaching their own specialism, and because many children are often strongly motivated when they see the relevance of a clearly-defined topic in their science work to a vocational interest.

There should be sustained encouragement for the large number of pupils whose abilities are more practical than academic. Some recommendations are made about their education.

Various forms of making provision for enrichment are described, and recommendations are made. However, the working party feels that such provision, though valuable, cannot replace regular class teaching in a group of children of comparable ability. It is therefore in favour of setting in science and mathematics from at least the age of thirteen onwards, and it believes that those aiming to take 'O' level should be taught in a set of their own. It is argued that the aims of the comprehensive school, to enable children preparing for different forms of employment, to know, learn from and respect each other, can be achieved without mixed-ability teaching after the second year in those subjects on which their future careers depend.

Such setting, however, can only be achieved in a school with at least a six-form entry. Accordingly, and while recognising that there are difficulties with very large schools, the working party stresses the need for closure of small schools (less than 1,000 pupils), if science education is to continue along the lines it considers desirable. The Paper asks, if smaller schools should become either national policy, or inevitable due to falling enrolments, whether some form of alternative provision for the most gifted children should be introduced.

The Paper will be of considerable interest to all those concerned with the education of talented secondary pupils in science and mathematics. It may be obtained from The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG and is free of charge.

8 SCHOOLS COUNCIL: STUDIES IN DECISION MAKING FOR SCIENCE EDUCATION PROJECT

The project will produce a series of analytical case studies written for heads of science departments, headteachers, local authority advisers and administrators. Schools will be selected, with the help of advisers, not on a statistical basis but with the intention of studying science teaching within a wide range of different approaches to comprehensive school organization and to curriculum development.

In the initial stages of the project, the team will undertake a programme of interviewing and participant observation in the selected schools. Timetables, schemes of work, examination syllabuses and general school records will also be studied. The data will then be analysed in terms of:

1 the content of existing science teaching programmes, and the teaching and assessment methods employed.

2 the factors influencing decisions during the development of particular programmes;

3 the nature and effectiveness of decisions about resource allocations;

4 a general evaluation of the coherence of the science curriculum in the context of the school's general aims.

The Project Director is Richard Hull, School of Education, University of Nottingham, University Park, Nottingham NG7 2RD.

9 SCHOOLS COUNCIL: LEARNING THROUGH SCIENCE PROJECT

The project has been set up to co-ordinate and extend the work of the existing local Science 5—13 groups, and to develop pupil materials for use with the teachers' guides of Science 5—13.

A document called 'Towards a School Policy for Science in Primary and Middle Schools' has been drafted and is under discussion in the regional groups. It is designed to assist headteachers to involve their staffs in drawing up their own school policy for teaching science, suited to their pupils and their environment. The project team will also help teachers to design their own school science resources bank.

At the same time, the team will be working on the development of pupil materials. Use will be made of work done by local groups: other items will be written by project staff or commissioned from outside sources.

The Project Director is Roy Richards, School of Education, University of London, Goldsmith's College, New Cross, London SE14 6NW.

10 ILEA: ADVANCED SCIENCE PROJECTS

Physics Details of the Advanced Physics Project for Independent Learning (APPIL) were given in SEN 39.6.

Chemistry The Independent Learning Project for Advanced Chemistry (ILPAC) began work in 1977 and is developing trial materials in the form of twenty written units, videotapes, tape/slide sequences and other teaching aids eg models and games. Both London and Nuffield 'A' level syllabuses are covered. The project director is Colin Robertson, Polytechnic of North London, Holloway Road, London N7 8DB.

Biology The Advanced Biology Alternative Learning Project (ABAL) began work in 1978 with similar objectives to the other projects. They plan to produce multi-media packages which adopt a guided approach to 'A' level Biology. Students will spend approximately half their time in group and practical work with the teacher, and the remainder in individual study in which they can proceed at their own pace. The teacher will be available at certain times to give help with individual difficulties, to assess progress and direct further study. In this way it is hoped to reduce the teacher time allocated for teaching small groups, to meet the needs of VIth formers following different programmes and provide a more flexible arrangement for study in Colleges of Further Education. The Project is directed from:

The South London Science Centre
Wilson Road Camberwell London SE5

11 ILEA: JUNIOR AND INFANTS SCIENCE TEACHER TRAINING (JISTT)

A system of in-service teacher training and follow-up support has been devised by the Inner London Education Authority for the benefit of the many primary school

teachers whose own science education has been too limited for them to teach science with any confidence.

Ten schools, situated close to one another are invited to send two teachers, one after the other, to participate in a full-time two-week course. A relief teacher is provided for the school during this four week period. After the course, this group of twenty teachers in the care of an Advisory teacher is responsible for planning its own programme on a self-help basis. It is expected that a group will establish a resource bank and produce a variety of material for use in the group's schools. In addition, course tutors continue to visit the schools as they are able.

The Course Director is Gron Edwards, c/o Peterborough Junior School, Clancarty Road, London SW6 3AA.

12 SHEFFIELD CITY POLYTECHNIC: TWO NEW COURSES IN CRAFT, DESIGN AND TECHNOLOGY

This Polytechnic has been able to offer a comprehensive BEd degree programme validated by the Council for National Academic Awards since September 1977. Two important new courses are now available within that BEd Degree programme covering Craft, Design and Technology which give an excellent initial training to students who wish to teach in this subject area, where a persistent shortage of teachers exists and employment opportunities are very good.

The courses concerned are entitled;

A Design and Craft

B Design and Technology

Both courses are strongly based in the Department of Design (Faculty of Art and Design) which already offers established BA degree courses in Three Dimensional Design, one with chief study in Silversmithing and Jewellery, and the second with chief study in Industrial Design. Other departments in the Polytechnic have also contributed to the design of the new courses and will be providing substantial facilities and expertise when teaching commences in September 1979. They are the departments of Civil Engineering, Electrical and Electronic Engineering, Mechanical Engineering, and the department of Metallurgy.

The course Design and Craft is the foundation course alongside which a student may choose to study one other course from a range of eight subjects including Design and Technology. It is designed to provide students with all the requisite skills for teaching Design and Craft subjects to the 11—16 years age range, as well as making a formative contribution to the students' own education. The course Design and Technology, which is available *only* to those students who choose Design and Craft, is structured to extend the students' Design Studies and general educational development whilst providing a major involvement with technology. This pair of courses will give a truly specialist training in the Craft, Design and Technology area potentially increasing the target teaching range from 11—16 to 11—18 years.

The central study of both courses is Design. The major learning approach is by the practical design projects which are structured in both courses to provide a full range of experience for every student initially and individual choice in the later stages. Wider historical and contemporary perspectives are developed through both courses as well as a thorough grounding in specialist teaching method. The components of each course are:

Design and Craft

Design Studies

Materials Studies

Practical Projects

Historical Perspectives

Teaching Method

Design and Technology

Design and Manufacturing Studies

Technology - Electrical, Mechanical and Structural

Practical Projects

Contemporary Case Study

Teaching Method

Each of these courses commands 6 hours per week of the timetabled BEd programme over three years, the remaining 6 hours being devoted to Education and Professional Studies for students intending to teach pupils in the secondary age range.

Entry to the Degree requires a minimum of two 'A' level passes amongst five GCE passes (or CSE equivalent) including English. Entry to Design and Craft requires one of the 'A' level passes to be in a Craft, Design, or Engineering Drawing/Science subject normally, but a candidate's alternative practical experience may be judged equivalent. For Design and Technology and 'O' level pass in mathematics and a physical science is also required. Candidates of good general quality, who have a strong commitment to creative practical activities are sought.

Further details concerning the BEd Degree can be obtained from:

Sheffield City Polytechnic
Faculty of Education
36 Collegiate Crescent
Sheffield
S10 2BP

13 UNIVERSITY OF CAMBRIDGE, FACULTY OF EDUCATION: M.PHIL IN MATHEMATICAL EDUCATION

This is a new course starting in October 1980, and is intended to appeal to a variety of applicants working in the general area of Mathematical Education. Applicants could be practising teachers and lecturers from all sectors of education, or people who wish to proceed to Ph.D. work by research or who wish to undertake school-based research, or education authority and Government advisers with a professional responsibility for mathematics education and its development.

The aim of the course is to enable the student to appreciate recent and significant research developments in the field of mathematical education. There will be consideration of both published and unpublished research, and the sources will be books, research journals, reports, theses and papers. In addition there will be a course unit on research methods and the students will carry out a small scale investigation. It is fully intended that the course will count as the first year of a Ph.D. if the student wishes to continue his studies. The course is therefore essentially academic, not professional, in nature and could well form part of a valuable preparation for a career in higher education. Professional concerns will not be neglected however and research ideas will always be considered in the context of their potential application.

Further information and application forms can be obtained from:

The Secretary
Board of Graduate Studies
4 Mill Lane Cambridge CB2 1RZ

Applications for the year 1980/81 should be made as soon as possibla, and before the end of March 1980.

14 UNIVERSITY OF SOUTHAMPTON FACULTY OF EDUCATIONAL STUDIES: RESEARCH OPPORTUNITIES FOR OVERSEAS STUDENTS

The Faculty of Educational Studies has a strong interest in international studies and is particularly concerned that research undertaken by overseas students should be closely related to the needs of the countries from which they come. To this end flexible M.Phil. and Ph.D. programmes, involving a combination of study at the University of Southampton and in the students' own countries, have been instituted.

Briefly, the arrangements now being developed involve an initial period of full-time study in Southampton in order to prepare the student for research. This is followed by a period during which the student, whilst registered as a part-time student at Southampton, undertakes the field work of the research within his own country. A further period of full-time study at Southampton during which, for example, the data collected are analysed and the work is written up, completes the programme.

The extent of the periods of full-time study required will depend on the nature of the research and the experience of the student. However, a *minimum* of one term will be necessary for each of the initial and final periods.

In order to ensure adequate supervision during the field work period students will be expected to correspond regularly with their supervisor in Southampton and to have face-to-face contact, normally not less than twice a year, at a convenient location. Although funds will clearly be required for this purpose, the whole programme for any individual student is likely to be considerably less expensive than full-time research undertaken wholly in the UK. And of course the results of the research are likely to be of more immediate application when the student returns to his country of origin.

These research arrangements apply to the whole range of the present interests of the Faculty of Educational Studies. Details of these can be obtained from:

The Academic Registrar
The University
Southampton
SO9 5NH

15 LINKS BETWEEN SCIENCE AND MATHEMATICS, 11—16 YEARS

In 1977 the Mathematical Association set up a working party to consider the ways in which the teaching interests of mathematicians and scientists overlap. At first this committee made a study of the existing literature and the science and mathematics courses in use, and produced a bibliography.

They have now turned their attention to the problems of collaboration between science and mathematics teachers, and to a study of schools in which there is close liaison between these teachers, and to its effects. They need help in identifying such schools, and would be pleased to hear from science or mathematics teachers who have such experience. Write to Dr K Hart, Mathematics-Science Links Committee, Centre for Science Education, Chelsea College, 90 Lillie Road, London SW6 7SR.

16 CAUTION: CATALYTIC OXIDATION OF AMMONIA IN THE LABORATORY

Readers who have not already received a letter from the publishers, Edward Arnold Ltd of the book 'Comprehensive Physical Science' by Portch and Simpson, should note that it is NOT safe to use OXYGEN in this experiment. On page 135, experiment 25.1 it is suggested in the text and on the diagram that air or oxygen may be used. While it is safe to use air, the use of oxygen is dangerous as it could result in an explosion. The publishers ask that the words 'or oxygen' be deleted in both places, in all copies of the book. The book is the 3rd edition of the one 'Physics with Chemistry', by the same authors, first published in 1967. It contains material for the last 2-2½ years of work for the physical science papers of the differing examining boards.

17 PUBLICATIONS

17.1 Nuffield Maths 5—11

The original Nuffield Mathematics Project produced a wide range of teachers' guides for teachers of mathematics at primary school level. This new Nuffield Project is producing a full range of pupils' materials, with corresponding teachers' handbooks.

Nuffield Maths 1 covers the age range from 'rising five' to middle infant, and is now published. The material can be used in a variety of ways, suitable for various classroom organisations, either for individual work, for group teaching or for class teaching. It combines structure with flexibility. Reference is made to commercially produced apparatus, but clear instructions are given for home-made alternatives.

Material currently available:

Teachers' Handbook 1, £4.00

Pupils' Worksheets, 12 copies each of Packs A, B, C, D, E, F at £1.00 per Pack

Bronto Books. These are available in 4 Sets (A, B, C, D), each set consisting of 6 booklets, at £1.50 per Set. They are designed for pre-school and infant children, and relate language and the development of basic mathematical concepts in a clear and attractive way.

Nuffield Maths 2 will be published in September 1979, and will extend the age range up to 7-year olds.

A brochure is available from Longman Group Ltd (attention Iris Sinfield), Longman House, Burnt Mill, Harlow, Essex, CM20 2JE. As well as further details of the materials, it contains a valuable analysis of the mathematical concepts dealt with, and the booklets or worksheets in which they appear.

17.2 Mathematical Education edited by G T Wain, published by Van Nostrand Reinhold, 1978 at £8.50.

This important book is a timely survey of a number of major aspects of mathematics education at both school and teacher training levels. Each of its 13 chapters is written by a specialist in the aspect under consideration, and many of the people who have been most influential in changes in the teaching and learning of mathematics over the past 2 decades are among the contributors — Professor Z P Dienes on Learning Mathematics, Professor K Lovell on Concept Development, Professor D Layton on Curriculum Theory, Dr A G Howson on the Diffusion of New Ideas, and Professor G Matthews and Mr D A Quadling on Primary and Secondary Mathematics respectively, among others. The contributions are introduced by Mr G T Wain, who has also edited what amounts to a collection of major essays which will be of interest to all those concerned with current issues in the teaching and learning of mathematics at school or teacher education levels.

17.3 New Trends in Mathematics Teaching, Volume IV, published by UNESCO, 1979 at £8.10, from HMSO and Government Bookshops.

The worldwide exchange of ideas and information is an important aspect of UNESCO's role. A contribution to this international exchange is the publication of the series New Trends in Mathematics Teaching, within the border series The Teaching of Basic Sciences.

Volumes I and II were published respectively in 1966 and 1970, and contained various articles on key topics in mathematics education, written by internationally recognised specialists. Volume III consisted of analyses of major problems and trends in mathematics education, and was prepared on a team basis.

This present volume is based on the preparations for and the proceedings of the Third International Congress on Mathematical Education (3 ICME), held in Karlsruhe, Federal Republic of Germany, in August 1976. This Congress, the largest international meeting of its kind, brought together nearly 2,000 mathematics educators from 76 countries. The Proceedings of 3 ICME have already been published (reviewed in SEN 36.25), and included summaries of the work of the 13 panels which formed the basis of the Congress programme. This present volume is a much fuller account of the work and conclusions of these 13 panels.

The 13 chapters deal with 13 broad themes of general educational interest for mathematics teachers and educators. 6 of these themes divide the field of mathematics education according to levels, ranging from pre-school to adult education. The remaining 7 make a 'vertical' division of the field, so that each theme is of interest for the work at all levels, eg curriculum development, evaluation, research, educational technology.

Each panel at 3 ICME had a reporter/author, who drafted the working document for the panel, and subsequently amended it for publication as one of the chapters in this present volume. In this task he was helped by an international advisory group of specialists on the theme in question, the 10—15 members being broadly representative of countries and of the various aspects of the theme. The international community of mathematics educators, as represented at 3 ICME, was in general agreement with these papers as showing the major trends and processes of mathematics teaching in the mid-1970s. All those who are actively interested in the improvement of mathematics education should find this volume useful: practising teachers and teacher educators, teachers in training, members of examination boards and teachers' associations, inspectors, curriculum development and research workers, and particularly those responsible for making decisions about mathematics curricula.

Selected chapters could also be used as resource material in mathematics education workshops and conferences.

The book is also being published in French and Spanish.

17.4 Mathematics for Schools, Level 1, Second Edition, by Howell, Walker and Fletcher, published by Addison-Wesley, 1979.

The Mathematics for Schools series, popularly known as 'Fletcher Maths', has been outstandingly successful. It is widely used in primary schools in England and Wales, and in English-medium primary schools in a number of other countries.

A Second Edition of the Level 1 material has now been published. While retaining the general approach and structure of the First Edition, a number of improvements have been made both to he sequencing of the mathematics and to the presentation of the work. The Teachers' Resource Book has also been clarified and amplified. It is an essential feature for any school considering adopting the course. An innovation is the appearance of a Parents' Booklet, a 32-page, 2-colour booklet designed to help the interested parent to understand the philosophy, content and teaching approach of the Mathematics for Schools course.

Pupils' books are packed in sets of 10, at £4.70 for each of Books 1-7.

Teachers' Resource Book each £5.00.

Parents' Booklet each £1.25.

A set of 40 Spirit Duplicator Masters are an optional extra at £9.00. There are also some Supplementary Enrichment Games, packed in pairs at £12.50 for each of 2 pairs.

Fuller details of both the Level 1 and Level 2 materials now available are contained in a publisher's brochure which also has an important Scope and Sequence Chart listing all the mathematical topics and the Books and pages where they are dealt with. Available from Addison-Wesley Publishers Ltd, West End House, 11 Hills Place, London W1E 5EZ.

17.5 References of use to teachers of mathematics: supplement, compiled by David Carter, Geoffrey Wain and Mary Jeffreson, published by The Centre for Studies in Science Education, The University, Leeds LS2 9JT, 1979 at £1.00.

The original booklet listed references from 12 journals up to May 1974. This new supplement updates the references to articles from the same journals in almost identical categories from June 1974 to May 1978. In addition, references to articles in three additional journals (Educational Research, British Journal of In-Service Education, and Educational Studies in Mathematics) for the period January 1960 — May 1978 are included.

The Supplement contains 93 pages of references and is a valuable index to articles covering new projects, all the major branches of mathematics, the teaching of the subject at various levels, examining and assessment, the history of mathematics and its teaching, and many other headings.

17.6 JSP Caribbean Maths: Textbook 5, Metric Edition, published by Longman Caribbean Ltd, 1978.

The Joint Schools Project was developed by teachers in Ghana in the mid-1960s and has been widely influential in the English-speaking countries of West Africa. Some years ago an adaptation for the Caribbean was undertaken, and this has now been completed by the publication of Textbook 5. This takes the work to the level of the GCE O level mathematics examination, and of the Caribbean Examinations Council Certificate in Mathematics.

The approach is modern, and the material has been subjected to testing in schools in a number of Caribbean countries prior to publication. The adaptation has been undertaken by Mr Ian Isaacs of the Department of Education, University of the West Indies, Jamaica.

17.7 New World Maths, Book 1, by John L Fox, published by Longman Caribbean Limited, 1979.

This is the first of a series of secondary maths texts designed to meet the needs of pupils in Caribbean schools. The mathematical coverage is based on the requirements of the Junior Secondary Leaving Certificate and the Caribbean Examinations Council syllabuses.

The book is written in an informal style, with maximum pupil participation and very carefully controlled use of language. It is attractively produced, and there is plenty of emphasis on basic numerical computation, presented in contexts meaningful in the students' own experience.

17.8 New Comprehensive Mathematics for 'O' level, by A Greer, published by Stanley Thornes, 1979 at £4.75.

This book is written for pupils who are studying or revising on their own for an 'O' level or School Certificate examination in Mathematics. The material covers within a single volume nearly all the topics to be found in any of the examination syllabuses at this level currently available, and the individual student will need to select the sections to study by careful reference to the syllabus to which he is working. Many will need help in this from an experienced teacher.

The book contains a very large number of examples, including some multiple-choice questions. Many of the examples are taken from recent examination papers. The book includes many worked examples, and answers to all the exercises. The basic facts and techniques are summarized for each mathematical topic. This format makes the book more suitable for revision purposes than as an initial learning text. Many students will find it useful in the year leading up to their 'O' level/School Certificate Examination, although a little of the material is most meaningful in a British context (eg VAT).

17.9 Graded Examples in Modern Mathematics, by Michael Browne, published by Methuen Educatinal, 1979 at £2.75.

This is a comprehensive collection of exercises, at both CSE and 'O' levels, to which answers are included. Each of the 49 topics also includes a brief statement of the key definitions and formulae, together with one or two worked examples.

Despite the word 'Modern' in the title, topics such as Pythagoras' Theorem, ratio, proportion and factorization appear alongside the more glamorous material more recently introduced at school level.

The book will be of most use to teachers looking for an additional source of examples. The explanations are too brief to be adequate for the individual student in need of revision.

17.10 Struggle: Mathematics for Low Attainers, published by ILEA, 1979 at £0.75.

The problems of how best to teach mathematics to less able children, or those who clearly under-achieve, is one that is exercising the minds of maths teachers in many parts of the world. This booklet will be of interest to all concerned with this problem. It is produced by the Inner London Education Authority as a 38-page booklet, with a large number of short contributions from those actively engaged in work with the less able in the schools of the Authority's area.

There is a useful short list of references to both books and articles on the teaching of mathematics to slow learners.

Enquiries may be made to ILEA Learning Materials Service, Publishing Centre, Highbury Station Road, London N1 1SB.

17.11 Mathematics to 16, by R L Bolt and C Reynolds, published by University Tutorial Press, 1979 at £2.40 with answers, £2.20 without answers.

This is the fourth book in a series designed to provide secondary pupils of average ability with a straightforward course in modern mathematics. It takes the work to a point somewhere between CSE and GCE 'O' levels. Enough traditional work is included to ensure that all current CSE syllabuses are covered. For 'O' level or School Certificate candidates the series would need to be supplemented in certain areas, depending on the particular syllabus being followed.

The format is an orthodox one, with brief but clear explanations being followed by worked examples and plenty of exercises for the pupils. The layout is clear, and care has been taken to see that language levels are within the capabilities of the pupils for whom the series is designed.

17.12 From the National Centre for School Technology.

The following publications, whilst aimed at teachers of technology, contain many useful ideas and much information which is suitable for the use of practising science teachers.

Technology Modules

These were designed by the School Technology Forum to aid teachers in developing their own technology courses. They cost 35p each.

1 Mechanisms
2 Electronics
3 Aeronautics
4 Food Technology
5 Metallurgy
6 Plastics
7 Pneumatics
8 Structures
9 Timber Technology

Construction Guides

Booklets which provide guidance on the construction of a range of equipment, instruments and teaching aids, are intended to meet the demands of course and project work.

1 Pulse Rate Meter (audio-visual display of heart beat) 50p

2 Tachometer (measures speed up to 20,000 rpm) 75p

3 Load Cell (measures loading in structures and forces in materials testing) 50p

4 Thermometer (analogue and digital read-out -20c to 400c) 75p

5 Hybridex (versatile construction system using aluminium rail) 50p

6 Power supply (simple to sophisticated designs for DC supplies) 50p

Other publications

Directory of resource material for teachers of technology in schools.
Alphabetical arrangement of reference headings from Asbestos to Zinc. Under each heading is a list of suitable resource material available in this country. The cost is 60p.

All orders to National Centre for School Technology, Trent Polytechnic, Burton Street, Nottingham NG1 4BU. Orders must be accompanied by a cheque or postal order made payable to Notts County Council.

17.13 The Continuing Swing? Pupils Reluctance to Study Science, by Dr D Duckworth, published by The National Foundation for Educational Researach, 1978 at £2.25.

This small book of 67 pages with references is as much a lesson in the analysis of statistical data as a discussion of the reasons for the swing away from A level science studies reported in the 1960s in Britain. The author draws a distinction, for example, between the proportion of sixth form students studying science subjects and the proportion of A levels obtained in individual science subjects. The Dainton Report used the former method but one has to take into account the peculiarities of different groups of sixth formers and the changing nature of the sixth form population, and so the latter method is preferred. Essentially, the new sixth formers of the 1960s did not always take the A level examination and were prevented in particular from taking A level science subjects, by virtue of the exclusion of science from their earlier secondary studies. In the 1970s comprehensive studies allow study of separate science subjects at O level but choice of study may be geared to expectations of examination success and the need to limit the number of O level examination subjects.

The author notes that there was a corresponding swing away from languages at this time. Science and languages have in common a cumulative learning pattern difficult to enter in the sixth form and were regarded by students as 'hard' subjects.

By contrast, economics, government and social studies can begin at a later stage in school life and enable the weaker student to secure an equal footing with his colleagues of a higher ability.

The case is presented for examination reform to provide motivation and less subject content in the sciences related to the new N & F proposals when the linear study from O level courses would not be so necessary. The common examination system at 16+ where subjects can be examined at different levels or grades is mentioned.

To some extent the situation was over emphasised by the Robbins' proposals leading to a provision for more

science and technology places in universities which could not be filled from the sixth form output.

The work value of such subjects as mathematics with statistics also influences A level choices, in addition to content interest and teaching approach. Should the priority be to provide education for manpower requirements? The choices made by the student in subject studies are in fact economic, vocational and educational in scope. The much publicised 'swing' away from sciences is more aptly described as a 'drift'.

OVERSEAS AND INTERNATIONAL ACTIVITIES

18 NEWS FROM THE CARIBBEAN

1 NSTA/CROASE Joint International Conference

This Conference was held from 20—22 April at the Dover Convention Centre, Christchurch, Barbados and the working days of the Conference were preceded by a meeting of the ICASE Executive Committee on 19 April.

The aims of the Conference were to bring together science educators from North, Central and South America and the Caribbean for discussion concerning mutual ideas and strategies for science education. This interest included an examination of the work of science teachers associations in the development and implementation of science curricula and provided Caribbean science teachers in particular with the opportunity of exchanging ideas and experiences with their overseas visitors.

2 Core Curriculum in Science

This course was developed by the Ministry of Education and the Association of Science Teachers of Jamaica. It is an activity orientated programme, intended to be used eventually in all types of schools where science forms part of the curriculum.

The core curriculum covers science in grades 7, 8 and 9 and is designed to inculcate attitudes such as self awareness, self-confidence, co-operation etc and to develop those manipulative, observational and problem solving skills which are vital for life in a scientific world.

Currently efforts are being concentrated on the development of the level 1 science core for grades 7—9. This will be followed by the development by 1981 of the level 2 core for grades 10—11.

Beginning in September 1978 about 38 schools participated in the pilot programme for grade 7. Included were all age, new secondary and traditional secondary types of schools. The teachers using the materials include interns and graduates of teachers colleges. The core science materials are presented in the form of pupils' workbooks and teachers' guides and are written by classroom teachers many of whom are part of the pilot project.

3 CXC Integrated Science Workshops

5 schools are currently involved in the pilot project for CXC integrated science. During the past term, workshops were held on Mondays at the Science Education Centre, UWI, Mona. During the sessions pupils' and teachers' books written by CROASE were examined and modified in the light of suggestions provided by the participants. Teachers tried out some of the activities.

4 CXC Workshop in Astronomy

To meet a previous request, a 4-day workshop was organised by the Ministry of Education and the Science Education Centre involving Mr Douglas Burke, President of the Astronomical Association of Jamaica. The workshop was held from 2—5 June 1979 and proved to be a very profitable and interesting session.

5 Workshop for Teachers College Science Tutors, December 1979

This workshop was held in the Physics Department of the University of West Indies and the Science Education Centre and was organised by Mrs F Commissiong of the School of Education, University of West Indies, Mona and Mr J W Steward of the Science Education Centre. The workshop intended to reach agreement on the primary and secondary general science college syllabuses and the mode of assessment. It also familiarised tutors with current developments in new school science programmes at both primary and secondary level and with the techniques of writing and analysing multiple choice items.

6 A Level Chemistry Teachers' Refresher Course, April 1979

The most recent A level chemistry teachers' refresher course organised by the Science Education Centre and the Chemistry Department of the University West Indies was held in March 1978 and a second course for chemistry teachers was held in April 1979. The scope of the second course was to be chosen from various suggestions including problem solving in chemistry, the mathematical requirements of chemistry teachers and students, language problems of chemistry students, and different strategies of approach to qualitative analysis.

19 INTER-AFRICAN SEMINAR ON THE TEACHING OF MATHEMATICS IN AFRICAN PRIMARY AND SECONDARY SCHOOLS

This seminar was part of the pan-African programme of the African Mathematics Union (AMU). It took place at the Kwame Nkrumah Conference Centre, Accra, Ghana, 16-19 May 1979. Local organisation was the responsibility of the Ghana National Committee on Mathematics.

About 45 participants were present, from Botswana, Cameroons, Canada, Congo, France, The Gambia, Ghana, Guinea, Ivory Coast, Kenya, Morocco, Niger, Nigeria, RECSAM (Malaysia), Swaziland, Uganda and the United Kingdom. UNESCO was also represented.

The major themes to emerge were curriculum development and the need to write and produce genuinely national textbooks; language problems; teacher education; and the need to give greater emphasis to the applications of mathematics in the teaching and learning of the subject in schools.

The AMU plans to hold a sequence of smaller, more specialised pan-African seminars, each devoted to a detailed consideration of a specific aspect of mathematics education at school level, over the next few years.

20 4TH INTERNATIONAL CONFERENCE ON MATHEMATICAL EDUCATION (4ICME), AUGUST 1980 (SEN 37.22)

The First Announcement of 4 ICME was issued in June 1979. For the convenience of readers who have not seen it, the major part of the content is reproduced below.

Venue: Berkeley, California, USA

Dates: 10—16 August 1980

USA hosts: National Academy of Sciences, and the University of California.

YOU ARE INVITED to participate in the 4th International Congress on Mathematical Education. The Congress offers participants an opportunity to become better informed about current issues and the developments in mathematical education at all levels. There will be many scheduled and unscheduled, informal events so that participants may gain from personal contacts.
THE OFFICIAL CONGRESS LANGUAGES are English, Spanish and French. At all times, simultaneous translations of at least one session, including all plenary sessions, will be available.
A REPORT OF THE PROCEEDINGS of the Congress will be sent to all Full Members.

Programs

The scientific program will examine a broad spectrum of problems in mathematical education at all levels and for every variety of learner. Special emphasis will be given to questions of universal primary education, of research, technology, applications, the profession of teaching, and the relationship of language and mathematics. Preliminary plans include four plenary session invited addreses, at least fifteen other main invited speakers (1 hour each) and about sixty panels and debates (1 to 2 hours). Many of the main speakers will be followed by a panel on the same topic. There will be about twenty 3-lecture series (called "miniconferences") on individual topics. Of special interest are proposed miniconferences in honor of the late Edward G. Begle on critical variables in mathematical education, and several expository series on topics which have become so fundamental, applicable, and pedagogically accessible that they could be considered worldwide for inclusion in the mathematics curriculum.

Short Communications

Following the pattern of the Third Congress, at Karlsruhe, participants are invited to present short communications via "Poster Sessions", where papers selected for presentation can be displayed and authors will be available for discussion. Posters may be submitted on all topics; especially solicited are posters on teaching mathematics to the handicapped and on problems and curricula in mathematical education in the participating countries. Details will be in the Second Announcement.

Projects

Selected research and development projects in mathematical education throughout the world will be invited to make presentations.

Exeter Working Groups and Karlsruhe Study Groups.

Existing working and study groups will be given the opportunity to meet, to continue their work, and to tie in with the rest of the program.

National and International Organizations and Journals

Meetings for national and international organizations of mathematics teachers and for editors of mathematical education journals will be scheduled during the Congress.

Films

Presentations of mathematical films are being organized. Forward your recommendations (NOT the films) to the official Congress address, marked "ATTN: FILMS".

Exhibitions

Publishers and firms producing teaching aids for mathematical education may present their books and materials. Teacher-made and student-made mathematics exhibits will also be displayed.

THE PARTICIPATION FEE for Full Members will be listed in the Second Announcement. There will be a lesser fee for Associate Members (accompanying a Full Member but not taking part in the work of the Congress). These fees include a choice of planned excursions and cultural events. Optional excursions and activities will be at extra cost. The fee will NOT include travel, accommodations, or board.
THOSE INTERESTED IN PARTICIPATING should write to the official Congress address:

ICME IV
Mathematics Department
University of California
Berkeley, CA 94720 USA

The Second Announcement and applications for registration and accommodations will be sent to respondents in December

COMMUNICATIONS should be mailed to the official Congress address. Mark "ATTN: PROGRAM" on requests about program. Mark "ATTN: LOC" on requests concerning exhibits, special interest groups, and local conference operations.
PLEASE COPY THIS ANNOUNCEMENT and distribute it to your colleagues and to other members of our profession.

21 SOUTH AFRICA: CONVENTIONS FOR TEACHERS OF SCIENCE AND MATHEMATICS

Every alternate year since 1969, the Foundation For Education, Science and Technology (FEST) has organised national conventions for teachers of Science and Mathematics. In previous years these have taken place in separate meetings for the White, Coloured, Indian and Black communities. In 1979, however, the intention was to have a single convention involving all the different educational systems in South Africa. Unfortunately, different school term dates necessitated a separate convention for the Black systems.

The Convention for science and mathematics teachers in the Black education sectors took place from 25 to 29 June 1979, using the splendid facilities of the Council For Scientific And Industrial Research (CSIR) Conference Centre. There were four consultants from Britain: Miss Brenda Jennison (Department of Education, Cambridge University), Miss Sheila Parker (Bristol Polytechnic) and Dr Bill Dudeney (Imperial College, University of London) for science, and Mr Bryan Wilson (British Council) for mathematics.

The White, Coloured and Indian sectors' Convention took place at the University of Witwatersrand, from 9 to 13 July 1979. The same three science consultants took part from Britain; Mr Geoff Wain (Centre For Studies In Science Education, University of Leeds) and Mr William Wynne-Willson (School of Education, University of Birmingham) were the mathematics consultants.

22 NICARAGUA: RADIO MATHEMATICS PROJECT

The Nicaraguan Ministry of Public Education has collaborated with Stanford University, USA in developing and running a project to teach primary school mathematics by radio in the rural areas of Nicaragua. The project which has been operating since 1974, is described in detail in two publications:

The Radio Mathematics Project: Nicaragua 1974—'75

The Radio Mathematics Project: Nicaragua 1976—'77

The first volume covers the early work of the project and describes curriculum structure, instructional methods and principles, and radio lesson design for first-grade mathematics lessons. The second volume carries the description of project work into later years. This Volume also presents information on teacher attitudes towards radio instruction, the impact of radio instruction on classroom organisation and teacher behaviour, the extent and patterns of educational wastage in Nicaragua primary schools and radio's effect on it, and the economics of radio instruction.

These books are distributed free of charge through support from the Development Services Bureau of the United States Agency for International Development. For further information, or copies of the books, write to:

Books
IMSSS, Ventura Hall
Stanford University
Stanford, California 94305
USA

23 INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING CONFERENCE, 1977

It has been said that the advent of the computer is the most significant development faced by mathematicians since the invention of the calculus. This is no less true of those concerned with the teaching and learning of mathematics. Many countries have embarked on programmes of computer education at secondary school level, and a record of an international conference aimed at sharing information between such countries on what was being done is now available.

The conference took place in Bulgaria in September 1977, and was organised by the International Federation for Information Processing (IFIP) Technical Committee 3, Education. The proceedings are a full record of the presented papers and the discussions to which they gave rise. They would be of interest to those in other countries planning the introduction of some form of computer education into their schools.

The report is 'Informatics and Mathematics in Secondary Schools' edited by D C Johnson and J D Tinsley, 1978, is published by North-Holland Publishing Company, PO Box 211, 335 Jan Van Galenstraat, Amsterdam, The Netherlands.

24 2ND EUROPEAN CONFERENCE ON ENVIRONMENTAL EDUCATION, 29 MARCH — 2 APRIL 1980 BERNE SWITZERLAND

The conference which is organised by the Institute of Environmental Science and the World Environment and Resources Council, is entitled 'Environmental Education' and its Applications' and will discuss the Tbilisi Recommendations in terms of the future needs of society. The conference language will be English. Further information can be obtained from:

Mr David Hughes-Evans
183 Quadrangle Towers
Cambridge Square
London W2

25 CENTRE FOR PEDAGOGICAL STUDIES, FLORENCE: CONFERENCE ON SCIENCE EDUCATION AND TEACHING METHODS IN PRIMARY AND SECONDARY SCHOOLS, OCTOBER, 1980.

The conference is being sponsored by the Universities of Florence, Pisa and Siena and will be held in Florence, Italy. Further information is available from:

Dr Paolo Manzelli
Istituto di Fisica Chimica
Universita di Firenze
Via G Caponi 9
50121 Firenze
Italy

26 PRACTICAL TECHNOLOGY: PROPOSALS FOR A JUNIOR SECONDARY COURSE

The originator of these proposals is aware that there has been a radical reappraisal of the form of general technical education in the UK. As a result, courses in design and technology are gaining ground in preference to the longer established woodwork, metalwork and technical drawing. A similar trend is not yet apparent in many overseas countries. While working in Mauritius he prepared an outline course, and draft materials for two units, with a list of the resources required. If any readers of SEN would like to see these proposals they are available from:

SFED
The British Council
10 Spring Gardens
London SW1A 2BN

27 COMMONWEALTH SECRETARIAT REGIONAL SEMINARS: LOW-COST SCHOOL SCIENCE EQUIPMENT

The first two meetings were held in the Bahamas 1976, and Tanzania 1977. The third, hosted by the Government of Papua New Guinea, was held at the University of Technology at Lae in March 1979. Participants were from the Soloman Islands, Tonga, Fiji, Northern

Territories of Australia and the host country. A number of observers were also present, from New Zealand, The British Council and UNESCO.

The meeting made strong recommendations for regional co-operation particularly to support national efforts: this co-operation to include the training of personnel for equipment design, development and production, as well as in-service and pre-service teacher training.

Case-studies of four production centres were prepared in 1976 to provide material for these regional seminars. They have now been published in 'Development and Production of School Science Equipment: some alternative approaches': Commonwealth Secretariat 1979, price £1.00. It contains information on:

National Centre of Educational Research & Training, India

Science Equipment Production Unit, Kenya

Centre for the Manufacture of Teaching Aids and Equipment, Turkey

Regional Centre for Education in Science and Mathematics, Malaysia.

The final chapter highlights some of the similarities and differences between the centres, including some specific areas of attention when the establishment of a local production centre is being considered.

28 UNESCO SUB-REGIONAL MEETING, SWAZILAND: PRODUCTION OF LOW-COST SCIENCE EQUIPMENT

The Government of Swaziland under a contract with UNESCO hosted this meeting in February, 1979. The participating countries were Botswana, Lesotho and Swaziland with an observer from Zanzibar, United Republic of Tanzania present.

The meeting resulted in all representatives preparing positive recommendations to be presented to their Ministries. In general they were that the facilities for the production of low-cost equipment already existing in their countries should be extended, both physically and in their functions, and that sub-regional co-operation should be fostered initially by regular biannual meetings.

29 ICASE-ASIAN SYMPOSIUM: LOW-COST EQUIPMENT FOR INTEGRATED SCIENCE EDUCATION AT ALL LEVELS, PHILIPPINES, DECEMBER 27—31, 1979

The symposium will feature the following:

1 Leading papers (solicited) on the philosophical, psychological, and pedagogical aspects relevant to the theme of the symposium.

2 Country reports on the local production and distribution of school science equipment, touching upon:

- a Rationale and objectives of the project
- b Structure and organization
- c Physical facilities
- d Staffing and personnel
- e Financial aspects
- f Nature of products
- g Mechanism for distribution
- h Future plans

3 Contributed papers on specific low-cost equipment that will be exhibited.

4 Exhibits of low-cost equipment for integrated science teaching at all levels.

English will be the official language of the symposium.

Registration fee for the symposium is P75.00 (or US$ 10.00) (Check or bank draft must be made in favour of ICASE-ASIAN Symposium.) This can be paid in advance or on registration day.

Further details from:

Dr C Y Lim-Sylianco
UP-PO Box 18
University of the Philippines
Diliman
Quezon City
Philippines

30 UNESCO-UNEP ENVIRONMENTAL EDUCATION NEWSLETTER: CONNECT

The editor has pointed out that this newsletter is published in English, in addition to French, Spanish, Russian and Arabic as reported in SEN 39: 37.

The June edition (Vol IV No 2) includes a report on a teacher training workshop on environmental education organised by the Science Education Centre of the University of the Philippines. The six-day workshop with the theme 'water resources' included field and laboratory activities as well as talks and lecture-discussions. The objectives were to provide practical experiences for the participants to enable them to learn concepts and principles of water-resource protection, conservation and management in the Philippines, and to develop competence in using the immediate environment in teaching them.

Two more workshops are planned, one on 'air' and the other on 'soil'.

31 SOUTH AFRICA: SCIENCE EDUCATION PROJECT

For the past year the project has had a full-time evaluator, who has collected and analysed data to assess the impact of the Project. The following four reports have been produced.

1 the developments of the worksheets during 1977 and the effect of their use during 1978

2 an analysis of the responses to worksheets used in 1978

3 report on the examination results in the Alice circuit

4 the introductory orientation course for 1979 — proceedings and evaluation.

Copies of these papers are available on request from:

The Science Education Project
PO Box 231
Alice
South Africa 5700

32 GIREP: EDUCATION AND TRAINING OF PHYSICS TEACHER WORLD-WIDE

A review of the education and training of physics teachers has been carried out by Brian Davies of Goldsmith's College on behalf of GIREP, the International Group for Research in Physics Education, with financial assistance from UNESCO. The directory is currently in draft form and an updated version, containing suggestions and comments from feedback on the draft version, will be available in the latter half of 1980.

Information contained in the review shows current methods, standards and educational trends in a variety of countries. It is intended to provide a starting point for considering new developments in the education of physics teachers, particularly in relation to adjusting education training programmes to local needs.

33 JOINT NORWEGIAN - BRITISH SCIENCE EDUCATION SEMINAR, APRIL 1980

Three British lecturers, and one Swedish contributed to this meeting in Norway of Norwegian teachers and teacher trainers.

The main themes of the seminar were:

1 Integrated science, from practical and philosophical standpoints

2 Evaluation of present day teaching of science in relation to the cognitive development of pupils

3 Teaching of different ability levels with emphasis on the lower ability range

4 The introduction of 'Science and Society' into school courses.

Differences in the education systems and the attitudes to Science education became apparent but there was also much common ground. Pre-service training of science teachers in Norway is for all three sciences so that the major British obstacle to Integrated Science does not apply. However the training is given in separate departments of Physics, Chemistry and Biology and so a real integration of science is not easily achieved. In all three countries, research suggests that the content of lower secondary science courses is unsuited to the pupils. In Scandinavia there is much emphasis on mixed ability teaching, and the idea of a course, such as the British LAMP, designed for a lower ability group, is unacceptable. Much interest was shown in the Australian Science Education Project because this also includes reference to the social aspects of science. Both countries are exploring ways of making science education more relevant to needs of society. Another common problem was that of the lower performance of girls in science subjects.

The interchange of ideas and experience proved to be of benefit and arrangements have been made for a further exchange of personnel.

34 CASME SOUTH PACIFIC REGIONAL SEMINAR, AUSTRALIA 1980

The Commonwealth Association of Science and Mathematics Educators (CASME) has planned this, its fourth biennial conference, to be held in Darwin from 10—14 March. The theme is to be 'Teacher Education in the social context with special reference to Science and Mathematics'. Lead papers which will be the basis for subsequent group discussions will cover the following topics: in-service training and re-training of teachers, distance learning in teacher education, use of educational technology, production of low-cost equipment, role of teachers' centres, language problems, individualised learning, and the special needs of minority or disadvantaged groups.

It is hoped that participants will come from a wide range of South Pacific and other Commonwealth countries.

35 CASME AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS 1978/79

The results of this competition will be announced early in October. Prizewinners will be informed and entries returned to those who requested their return. The results will be published in SEN No 41.

36 COMMONWEALTH ASSOCIATION OF SCIENCE AND MATHEMATICS EDUCATORS (CASME): AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS 1979/80

1 Introduction

The purpose of these awards is to encourage teachers in schools and colleges with particular reference to developing countries of the Commonwealth in the teaching of science and mathematics.

In recent years there has been an emphasis on social aspects of science and mathematics teaching and it is hoped that entries will continue to reflect this trend. Emphasis should also be given to the relevance of science and mathematics curricula to local needs and conditions and to the impact of technology and agriculture on the local community.

2 Countries involved

The following Commonwealth countries have been involved in the scheme in recent years:

Associated States of the Eastern Caribbean, Barbados, Belize, Botswana, Britain, Cyprus, Ghana, Guyana, Hong Kong, India, Jamaica, Kenya, Lesotho, Malawi, Malaysia, Malta, Nigeria, Sierra Leone, Singapore, Swaziland, Tanzania, Trinidad and Tobago Uganda, Zambia.

The organisers would be happy to receive entries from other countries as well.

Full details are given below of the arrangements for the 1979/80 competition.

3 Topics for the Competition

Awards will be made on the basis of reports submitted to the Judges relating to the following aspects of science and mathematics education:

— the development of teaching materials aimed at introducing pupils to the broad field of social impact of science and mathematics.

Aspects of science and mathematics education suggested as suitable for consideration are:

— the development of curricula and syllabuses;

— the design and production of teaching materials to meet special needs;

— investigation of the learning process in relation to study and teaching;

— the planning, equipment, provision and use of laboratory facilities, including resourceful solutions to meeting needs in circumstances of limited facilities;

— a science exhibition contribution;

— language and the teaching of science and mathematics.

These subject areas will remain as broad outlines within which new materials may be developed and under which entries may be submitted, but in each entry the relationship of the work carried out, to its social context and its impact on the nation, community or individual must be made clear.

It is intended that the topic of the entry should be based on personal experience and should include a substantial account of teaching and/or other education work actually carried out on the suggested lines.

In recent years, award-winning entries have covered the following topics:

A detailed ecological study of a given area;

Water pollution;

Industrial education terminology;

Concept of noise pollution;

Description of a schools science exhibition;

Motivation of children's interests in the learning of Magnetism;

The influence of culture on the learning and teaching of science in an area;

The planning, equipment provision and use of laboratory facilities;

Project work and Teacher Education;

Improvisation of mathematics apparatus from waste materials.

4 Awards

Awards to the total value of £300 will be made according to the decision of the Judges. This sum will be generously provided by the Commonwealth Association of Science and Mathematics Educators. The right is reserved to refrain from awarding a first prize if the Judges advise that no candidate has submitted an entry worthy of the award. In the event of no first prize being awarded the prize money may be divided in whatever manner appears equable in the light of the Judges' recommendations. The decisions of the Judges will be final and no correspondence will be entered into concerning their decision.

5 Categories of Entrants

Entries are invited from teachers in primary, secondary or tertiary education institutions.

Entries may be submitted by either individuals or syndicates (eg the science staff of a school or college, or a partnership of teachers from more than one institution).

6 Presentation of Entry

Only one entry can be accepted from any one entrant or syndicate.

The entry must be written or typed on one side of quarto sheets of paper. Reports should not exceed 10,000 words in length and normally might be expected to be of the order of 2,000—5,000 words.

Photographs and other illustrative material should be included wherever relevant, together with any other evidence that shows the ideas have been efective in practice. Such evidence should include the work of pupils whenever possible.

Reference should be made to the source of information or of original experiments wherever this is necessary to a proper assessment of the proposed modifications. If any substantial part of an entry is being published or submitted as a thesis, this should be mentioned on the top sheet of the entry.

The Judges will pay more attention to evidence of original thought and ingenious application than to mere bulk. Moreover, as stated in paragraph 3, the report should be based on personal experience and work which has been actually tried out long enough to provide some evidence of its value.

7 Dates

Registration must be made before 31 December 1979.

Entries from officially registered candidates must arrive in Schools and Further Education Department of the British Council before 1 March 1980.

The Awards will be announced in the summer or autumn of 1980.

8 Treatment of the Selected Topics:

The Judges will be glad to consider any reasonable treatment of the selected topics provided it is based on personal, or team, experience and it includes a substantial account of teaching and/or education work actually carried out relevant to the topic. The CASME Awards Scheme is intended to reward original teaching carried out for long enough to enable a reasonable assessment of it to be made. Entries which are only suggested schemes, new programmes or revised syllabuses which have not been tried out will not be considered. Judges may return an entry for submission at a later date if it shows promise but has been submitted prematurely.

The following may be of help to intending entrants. While these may provide guidelines for the construction of an entry, it is not suggested that this is the only form of submission:

An account should be given of:

— the background to the work;

— the particular difficulties or problems which were to be solved, or other reasons for the work;

— the thinking (principle) on which action was based;

— what action was taken and how it was carried out;

— reactions and results;

— further action to be taken or rethinking.

Application for Registration must be made before the date given in paragraph 7 above.

Intending applicants should use the form on the back page, or apply to:

1 Your local British Council office

2 CASME Awards, c/o Schools and Further Education Department, The British Council, 10 Spring Gardens, London SW1A 2BN.

9 **Please note that reports submitted must be the entrant's own original work, and should not have been published to date.**

LATE NEWS

37 UK NATIONAL MATHEMATICAL CONTEST, 1980

The National Mathematical Contest (NMC), using the American High School Paper, takes place each March. The date in 1980 will be 4 March. The contest is limited to material from elementary algebra, simple plane coordinate geometry, intermediate algebra and trigonometry. Most of the candidates are sixth formers, but bright fourth and fifth formers can do well on the paper.

The names of the high scorers in the 1979 NMC appear in the September issue of the journal "Mathematics in School". High scorers are invited to take part in the British Mathematical Olympiad (BMO), which takes place shortly after the NMC.

The 1980 team for the International Mathematical Olympiad (IMO) will be chosen from those BMO candidates who are invited to take a Further International Selection Test (FIST).

Copies of the 1976, 1977, 1978 and 1979 NMC papers, with solutions, of the 1977, 1978 and 1979 BMO papers, of the 1977, 1978 and 1979 FIST problems, and of the 1976, 1977, 1978 and 1979 papers are obtainable from the Mathematical Association, at 20p per paper. The Mathematical Association, 259 London Road, Leicester, LE2 3BE.

38 UK STANDARDIZED TESTS IN MATHEMATICS

In many countries there is concern with problems of the assessment of pupils' mathematical competence. The Mathematical Association has produced a small publication listing the standardized tests in mathematics that are available in the UK for the 7—16 age range, and commenting on them. The purpose of each are described and guidance given on appropriate selection from what is available.

There are notes on wider aspects of assessment in the general context of testing and assessment in school courses. There is also a valuable glossary of 'testing' terminology, such as 'norm-referenced', 'criterion-referenced', 'standardized test', and so on.

Finally, details of the availability of over 20 of the most widely-used mathematics tests in British schools are given.

'Tests' is published by the Mathematical Association, 259 London Road, Leicester LE2 3BE, 1979 at £1.00.

39 SCHOOL SCIENCE EQUIPMENT IN THE THIRD WORLD: TAPE/SLIDE

The advent of new science curricula for schools which utilise activity methods and which subscribe to more general curriculum objectives has generated a widespread need for low cost equipment in developing countries. The present tape slide programme gives a general introduction to the problems associated with school science equipment in the Third World such as the ordering of equipment from a commercial supplier. The role of the teacher as a handyman is stressed and local science centres can provide the simple machine tools required for batch production. Bulk buying and instrument repair are also functions of these centres which should be considered in the planning phase.

A later sequence in the presentation deals with science equipment manufacture and the problems associated with staffing and maintenance. The whole discussion is illustrated by 3 examples taken from overseas countries.

The package contains the synchronised tape and set of 72 35mm colour transparencies with notes (which include a comprehensive bibliography and a list of science teachers associations). Copies of the package can be seen and purchased through your local British Council office. In case of difficulty please contact the Information Officer, SFED, The British Council, 10 Spring Gardens, London SW1A 2BN.

40 INTERNATIONAL CONFERENCE ON CHEMICAL EDUCATION, DUBLIN, SUGUST 1979

The conference was attended by about 300 participants from some 60 countries with the largest contingents coming from Ireland, UK and USA. It was perhaps unique in having among the participants a reasonable proportion of chemistry teachers from schools. Indeed the organisers particularly asked the various sponsoring organisations to send ordinary chemistry teachers rather than the usual representatives from academic institutions and administrative organisations.

The main theme of the conference was the teaching of chemistry — interaction between secondary and tertiary levels. The programme comprised plenary lectures, discussion sessions and poster sessions. The plenary lectures covered topics such as 'What chemistry is needed for chemists and citizens', 'What balance should be sought between fact and theory in chemistry curricula', 'How should we educate chemistry teachers?'. There were also one or two sessions on the content of chemistry, particularly chemical equilibria and energetics, and structure and bonding.

This conference was one in a series of chemical education conferences sponsored by UNESCO over the last ten years. The previous international conference was held in 1977 in Ljubljana, Yugoslavia; the one before that was in Wroclaw, Poland. The proceedings of the conferences appear in the UNESCO series New Trends in Chemistry Teaching.

41 NEW SCIENCE EDUCATION JOURNAL FROM THE CARIBBEAN

This first volume augurs well for the future, presenting a lively account of current developments in science education around the Caribbean area. For example, Winston King, in an article entitled 'Science and Society', describes the impact of science on society and the implications for the school science curriculum. Gerald Rose, also from the Cave Hill Campus of the University of West Indies, discusses the integration of mathematics and science teaching. John Masters in the Curriculum Development Centre, Guyana describes independent learning and its local applications. Dave Webb later discusses the effect of teaching aids on local practice and Colin Lancaster provides an authoritative discussion of the Assessment of Project Work in Science. Finally, Workeley Brathwaite comes even closer to home with a description and assessment of the implications dealing with General and Basic considerations of the Caribbean Examinations Council Secondary Education Certificate Fact Sheet.

'Caribbean Journal of Science Education' is available from The School of Education, University of The West Indies, POB 64, Bridgetown, Barbados. Vol 1, no 1 published in April 1979 is free of charge. The subsequent 3 issues are charged at US $3.

42 SCIENCE EQUIPMENT IN BELGIUM

There are two Ministries of Education in Belgium, one for the Flemish culture and one for the French. Each of these Ministries has an equipment centre, both of which are concerned with the development, production, procurement and distribution of school science equipment. In addition both centres participate in In-Service teacher training courses, and provide equipment repair facilities.

The centre for the Flemish speaking sector is located in Ghent while the one for the French speaking sector is in Mons. The Technische Dienste, Ghent is the oldest established centre dating back to 1957 while the Centre Technique de l'Etat in Mons was established in 1972.

Science equipment for school teaching purposes is centrally purchased by both education ministries. Bulk purchasing and distribution reportedly saves up to 40% of the costs. Packages of equipment for schools contain equipment purchased from commercial suppliers as well as items produced in the equipment centres.

The centres operate only for the State schools. City and Free schools purchase their equipment individually.

43 THE SCHOOLS/INDUSTRY LINK SCHEME

This is one of the activities described in the first issue of the Science Centre Bulletin, which is dated summer 1979, and published by the Science, Mathematics and Technical Centre of University College, Cardiff.

The link scheme began in South Wales in 1970, and now, 72 schools have an industrial link with 22 local industries providing link officers to liaise with the schools.

The scheme envisages visits, work experiences, lectures, gifts of material and obsolete apparatus to schools, assistance with school projects, course work and careers education.

At present, the scheme is underused, through lack of staff time and pressure of examinations. The organizers feel that schools/industry activities should be built into school course requirements, with serious curriculum commitments before the scheme can prosper.

Other kinds of school activities, related with industrial experience, are concerned with the development of Mode 3 CSE courses and 6th form activities in Wales.

Some examples of this kind of work are:

1 At Cross Keys Tertiary College in Gwent, where there is a scheme for A level students to spend a week in industry during the holidays at the end of their first year.

2 Cardiff High School similarly provides 2 or 3 day visits to local industry for their senior students.

3 Mode 3 CSE Courses at Llonisien High School, include a course dealing with electronics, operating in the 4th and 5th years. The practical work is in fact expensive but pupils from a wide range of abilities are highly motivated.

4 At Whitchurch High School, there is a Mode 3 applied physics course for potential industrial apprentices. This study includes a treatment of gear systems, fluid dynamics, electronic circuits and basic electricity. Pin fastened frameworks and industrial applications are also included in the course.

REGISTRATION FORM

THE CASME AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS

Administered

a. locally by: Your local British Council office

b. in London by: CASME Awards
Schools and Further Education Department
The British Council
10 Spring Gardens
London SW1A 2BN

PLEASE READ THIS CAREFULLY BEFORE COMPLETING THE FORM

A Registration Form must be completed and received by the above Administrator by **31 December 1979.**

As acknowledgement of receipt of the Registration Form you will receive a 'Top Sheet' giving you a Registration number. You must submit this Top Sheet with your entry and the number will be your identification. Please do not add your name and address as the number will identify you. Please also use this number in any correspondencee.

If your address given beneath changes between completing this form and the notification of the Awards **please advise** the London address above.

In the case of a syndicate entry please list, on a separate paper, the names, qualifications, teacher experience and present position of all members.

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1. Name of entrant
or syndicate nominee
(Block letters with Surname underlined) .....

2. Address for Correspondence .....
.....
.....
.....

3. Name of School or College .....

4. Brief title and outline of proposed entry .....
.....
.....
.....

5. Qualifications, with dates (eg degree, teachers certificate) .....
.....

6. Brief record of teaching service and present position .....
.....

7. I have/have not* previously submitted an entry for the Guiness Award or CASMF Awards Scheme.

8. If you have, please give details .....

9. This entry has/has not* been submitted for consideration in other competitions.

If so, please give details .....

.....

10. I certify that this entry is my (in the case of a syndicate entry, our) own original work, and that it has not been published to date.

Signed..... Date.....

DISPOSAL OF ENTRY

A. If the entry receives an Award, first publication rights are thereby assigned to CASME.

Signed..... Date.....

B. If the entry does not receive an Award, please return the entry to me/or CASME may retain the entry with first publication rights.*

Signed..... Date.....

*Delete part which is not applicable